



# The co-production of a "relevant" expertise – administrative and scientific cooperation in the French water policies elaboration and implementation

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# The co-production of a “relevant” expertise – administrative and scientific cooperation in the French water policies elaboration and implementation

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Abstract

This paper aims at understanding the social and political uses of the principle of integrated management and its possible impacts on the elaboration and implementation processes of public policies in the French water management field. The academic and political innovations developed by scientists and agents of the administration these last 25 years are analysed, using some of the theoretical tools developed by the science studies and public policy analysis. We first focus on the construction of intellectual public policy communities such as the GIP Hydro systems, at the origin of large interdisciplinary research programs in the 1990s. A common cognitive framework is clearly built during this period on the good governance of the aquatic ecosystems and on the corresponding needs and practices of research. The second part of the paper focuses on the possibilities to build political communities and more or less integrated expertises in the decision making processes concerning various issues related to water management. Eutrophication and its inscription on the French political agenda is a very significant case for analysing the difficulty to build such a political community. On the contrary, when there is an opportunity for policy evaluation, which was the case concerning the management of wetlands in France or the implementation of compulsory flows on the French rivers, these communities can emerge. However, the type of integrated expertise and management proposed in these cases of policy evaluations much depends on their methodological choices.

1 Introduction

1.1 Context

New modes of public action have been experimented these last decades, essentially oriented towards the search for a consensus among the concerned social groups and a good balance between the economic and social interests impacted. Environmental

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policies are probably the most advanced field of experimentation of these new ways to conduct public policies which can be referred to under the key word “integrated management”.

5 Yet, giving a unique and exclusive definition of integrated environmental management would be a worthless task. The European Water Framework Directive (WFD, directive 2000/60/CE, December 2000) establishes, for the state members, a duty of “good ecological status” for their surface waters. Nevertheless there is no clear and explicit definition of this “good status”, neither in the text itself, nor in the various instruments of public policies listed in the WFD: territorial planning (Articles 5, 11 and 10 13), public participation (Article 14), economic assessment (Article 4), identification of priority pollutants (Article 16)<sup>1</sup> ... Then how can one explain the constant political and administrative reference to the so called standard of integrated management?

### 1.2 Problematic

15 First of all, who exactly are the social and political actors who are committed to implement this integrated management? In this paper, we will try to understand the social and political uses of this concept and its possible impacts on the development and implementation of public policies processes.

To be fully understood, integrated management in environment (and more specifically in water management) has to be linked with two other issues: the crisis of democracy and the role of experts in politics. The emergence of new types of risks, the 20 increasing number of actors involved in the decision making process, have led to question the ability and legitimacy of experts “to tell the truth”. In this context, the public power has in the last decade been seeking for new ways of decision making. Public authorities tried, in particular, to involve the general public while turning towards new

<sup>1</sup>These priority pollutants should incorporate at least the 33 substances listed in the decision no. 2455/2001/CE (November 2001) of the European Parliament and European Council (modifying the Directive 2000/60/CE).

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modes of research, no more based on specific knowledges raising the issue of interdisciplinarity. We analysed the academic and political innovations developed by scientists and agents of the administration in the French water management field, using some of the theoretical tools developed by science studies and public policy analysis. On the one hand, those science studies have ultimately showed that science is not an autonomous activity<sup>2</sup>, and following this interpretation, we propose to consider the expertise and the experts in the water management field not as an in-between public action and research practice but, on the contrary, as an achievement of the internal logics of these two social activities. On the other hand, public policy analysis has established that policy making processes are characterised by the participation of larger policy networks than in the past times. Some authors use the terms of “policy communities” or “issue networks” to designate this phenomenon, depending on the level of coherence of the network and interdependence of its members (Gaudin, 1999). These networks produce, at the same time, the cognitive framework that enables the translation of social concerns into manageable issues, and the political compromises which are embedded in the decision. Taking into account not only this production of meaning but also integration of interests in the public action, Sabatier (1999) built the concept of a “policy frame” to design an approach in which he could relate the changes as a result of an “advocacy coalition’s” work. In the case of French water management, we will distinguish two different types of policy communities: on the one hand, the intellectual one, more oriented towards the production of a collective meaning on the right way to

<sup>2</sup>Social Studies of Science have, since the seventies, put the emphasis on the processes of construction of scientific facts. The everyday work of scientists, the funding of science, the organization of scientific communities and the regulation of the scientific field, the modes of data production and the building processes of scientific theories, the diffusion and reception of these theories and their impacts on the technological innovations have been investigated. The scientific activity in that tradition is considered as a social activity even if it is constructed as independent from the social and political realm of interests. For a better understanding of the transactions and corresponding processes of “purification” in between politics and science see Latour (1989) and Stengers (1993).

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produce the scientific knowledge and on the fairest way to reach a consensus on their management; on the other hand, the political one, more oriented towards the building of compromises on issues inscribed on the political agenda. Crossing those two approaches, we are aiming at avoiding taking part in the recurring controversy of what is “real” integrated water management.

Intellectual and technical tools as well as institutional facilities, created in order to promote such an integrated management, were analysed from two perspectives, corresponding to the two parts of this paper:

- We first investigate the discourses defining the “fair” governance practices and the “relevant” forms of research on the aquatic ecosystems. These types of discourses are produced from places such as conferences involving managers and scientists, editorial boards of engineering reviews... In this case, we will talk about “intellectual” public policies communities (Jordan, 1990; Jordan and Richardson, 1987).
- In the second movement of the demonstration, we propose an analysis of the “political” communities built by scientists and administration agents which aim at raising new issues and design new policy instruments in the water management field.

### 1.3 Methods and material

Three case studies were conducted in order to investigate these intellectual and political public policy communities. The first case study is a French research network on hydro systems; the second one is the controversy about eutrophication and the programs launched in the 1990s in France in order to reduce it, and the third one is a comparison between the processes of evaluation and design of, on the one hand, a program of management of French wetlands and, on the other hand, the regulation of water flows imposed to French hydraulic electricity plants. In the first case study we were able to produce interesting material in order to understand the institutionalisation

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process of an intellectual public policy community (Sect. 2) whereas the other considered issues offered to the analysis a good range of situations in order to formalise the possibilities for administrative agents and scientists to build political public policy communities. The management of wetlands and the programs implemented in order to reduce eutrophication corresponded to cases of new public policy issues, whereas the case of rivers flows was an old and controversial issue coming back from time to time on the governmental agenda (Sect. 3).

In these three cases, we interviewed the key actors who took part in the formalisation of the problem. We tried to get from them the story (which is not necessarily the official one) of how they dealt with the problem and the corresponding uncertainties. We paid attention to the documents produced, took into consideration the data collected by the policy makers and, also, the processes of transformation of these data from one report to another. In addition to this material, we considered the legislation and regulation adopted on the three issues.

## 2 Intellectual public policy communities and the production of an integrated discourse on governance and research on hydro systems

To test the hypothesis that discourses on the integration of research and public action in the water management field are, first of all, produced by an intellectual public policy community formed by scientists and civil servants in charge of the water policy development and implementation, we observed that community at work. We studied more specifically one of its most institutionalised forms: a network of researchers on hydrosystems, structured by the French ministry of Environment in the late 1990s: the Group of Scientific Interest for the Research on Hydro systems (GIP-Hydrosystèmes). This group launched several interdisciplinary research programs, especially on floods and on wetlands. These programs were quite typical of the large French interdisci-

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plinary programs in environment implemented since the seventies<sup>3</sup>. What were the transactions that took place between the scientific and administrative fields in this network and during these programs? In all of them, the researches conducted aimed at understanding the relations between the environmental elements and the induced risks rather than elaborate environmental protection strategies. The first significant characteristic of this intellectual community is therefore that all its members shared a strongly structured definition of the environment. The environment being studied was and had to be human centred. Therefore, it is the pollution and its impacts on the human activities that had to be investigated and revealed. This intellectual posture is similar whatever type of knowledge one considers: hydrologists are going to work on the transfer of pollutants, biologists are going to analyse the evolution of the fish stocks, and economists are going to look at the benefits of hydrosystems; but all of them shared the same vision of environment either as a context or a product of the human activity. This perception, so commonly shared, even by the present author, had to be clearly explicated, as it might not correspond to the vision of users of the aquatic eco-systems, for instance some of the Non Governmental Organisations who claim for an environmental protection, for “the nature itself” and not because of a determined functionality of the environment. This is even more important as the second characteristic of this network was that its members viewed the research as the result of the meeting of a social demand and a supply of science. This perception of the research work was particularly acute in the administrative literature presenting these programs (see, in particular, [www.oieau.fr/hydrosys/gip.htm](http://www.oieau.fr/hydrosys/gip.htm)). Nonetheless, what occurred there was more complex than the official presentation done by scientists and administrative agents. It was a pragmatic coordination of the existing structures of research on the environment.

One of the main institutional and cognitive innovations of this program was the exper-

<sup>3</sup>The program on hydro systems took place after a set of quite similar programs (since 1978 and the first PIREN). For a more detailed description of the co-construction of an environmental research policy in France, see Neboit-Guilhot and Davy (1996).

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5 imentation of a territorial organisation of the research on hydro systems and especially  
the one on wetlands. Several watersheds were chosen as priority areas for research  
and observation. The researches used hydrology, biology, chemistry, but also social  
sciences. Moreover, they had the objective to put into coherence the newly produced  
10 data with the existing ones. One can, then, say that there was a clear political will-  
ingness to bring more coherence in the available expertise, useful for the elaboration  
and implementation of the public programs. At the same time there was a necessity to  
separate the activities of research and the ones of government. This appears clearly  
when looking at the institutional building in this network: two councils officially ruled the  
15 program, one administrative and the other scientific. Further investigation showed that  
both councils were mixed (some members, especially in the administrative one, being  
competent in both administrative and scientific fields).

The coherence in between the researches was in fact built afterwards. On the first  
hand, as it appears in the Table 1, the programs consisted more in a collection of  
15 researches related to one specific type of knowledge rather than integrated researches  
dealing altogether with one specific issue. On the second hand, there were types  
of knowledge much more funded than others (hydrology and biology for natural hard  
sciences and economy for social sciences).

Nonetheless, all these researches had in common a prescriptive dimension (rather  
than a descriptive one) and, as a consequence of this constraint, the researches in-  
volving modelling tools were preponderant<sup>4</sup>. A cognitive framework was undoubtedly  
20 settled while this kind of research programs was developed: (a) the relevant scale for

<sup>4</sup>The program of research on wetlands management is probably the most interdisciplinary  
one and is clearly oriented towards a prescriptive objective: as the call for propositions mentions  
“The program should enable the deciders to design and validate methodologies for protection,  
management or restoration of wetlands”. This prescriptive objective is explicitly present in some  
of the funded researches such as the one aiming at elaborating the rules of management of  
the superficial waters in order to promote an integrated development of wetlands boarding the  
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good research and the relevant territory for good governance is the watershed; (b) “policy entrepreneurs” from the administration and scientists shared a preference for prescriptive researches (tools incorporating modelling). These tools should have enabled the stakeholders to get a clear view of the trends under a set of limited scenarios.

5 The vision of the “good governance” behind this type of tools was that the uses of the ecosystems should have been negotiated between the various users in order to maximise the preservation of the resource.

The concept of “intellectual public policy community” is interesting for understanding how a group of administrative agents and scientists built a cognitive framework consisting in a common perception of the environment and of the good governance, and a common view of the best way to conduct the research on the aquatic ecosystems. We have shown that this cognitive framework, in fact, led rather to a collection of specific studies than to a coherent set of tools enabling, for instance, to assess the impact of planning projects on wetlands. But the important thing was that these policy entrepreneurs benefited new reasons for a public action fostering ecological preservation rather than legitimate tools for effective public choice.

This statement raises the question of the benefits for the members who belonged to that community. Building that community, and sharing the described cognitive framework, the members undoubtedly benefited an extra of legitimacy for their own specific activities. This extra was possible because, at the end of the process, the research program appeared as the meeting of a demand (coming from the civil society) and of a supply (coming from the scientific community). Even though the detailed analysis of the community revealed that this meeting was not so obvious. The discourse on “integrated water management” was a way for the members of the “policy community” to perform, whatever their identity, different roles: they could be, at the same time, provider or user of science, or mediator between users and providers of scientific expertise. The provider of science could, for instance, be a scientist working for the university, or an expert in a technical department of an administration, or in the department of research of the French electricity company, or a private consultancy, less often, someone work-

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ing in a technical department of a municipality, or a representative of a NGO working in the field of environmental protection.

On the contrary, except those providers of science who could, at the same time, be potential users, there were no representatives of other users. According to the providers and mediators, the users were always the ones who, outside the community, were asking for such or such research and who might have benefited the results. The performance here consisted in the simultaneous construction of a supply and a demand of research, in the name of potential users. The social utility of the researches was guaranteed because of the distinction in the roles, no matter if the provider of the expertise is also a potential user or a mediator.

The standard of integrated water management had to be considered, in a first movement, as the product of one of the most explicit forms of cooperation between scientists and administrative agents. We showed that this cooperation resulted in the construction of a collective cognitive framework integrating the best way to promote good governance and to conduct the research on aquatic ecosystems. The standard of integrated water management is moreover a way for the scientists to legitimate their researches, and for the environmental administration to find new reasons for the public policies they are in charge of.

This first context is however not sufficient to understand the various uses of the standard and it is necessary to analyse the conditions of its implementation when administrative agents and scientists are involved in the “daily” decision-making processes.

### 3 Political public policy communities and the use of expertise in the construction of water management policies

The second part of this paper consists in an analysis of the expertise required in the processes of policies and programs elaboration itself. We focus on the reduction of pollution policies (eutrophication) and on two issues that were subject to a policy evaluation (policies for wetland management and the regulation of flows for hydraulic elec-

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tricity plants). The purpose here is to analyse the cooperation between administrative agents and scientific experts developed in order to build political communities. The performance is much more complex when the cooperation deals directly with political decision and not only with elaborating a coherent discourse on the relevance of “doing something and doing it the right way”. The possibility to build these political communities depends on the political opportunities offered by the structure of the French political organisation. This structure of political opportunities can be roughly understood as the capacity of a political structure to respond to and to integrate social claims (McAdam et al., 1996). The capacity will highly depend on the lack or on the existence of procedures that enable the governmental organisations to take into consideration the social movements. Considering the notion the other way round, we can define it as the ability of an actor or a coalition of actors to use the existing political procedures in order to change the governmental agenda (Garraud, 1990). In the three examined cases, the capacity for producing an integrated expertise relies on a structure of political and technological opportunities at a national and a territorial level.

3.1 The expertise dependant on the organisation of the water management field: the case of eutrophication in France since 1988

In the case of eutrophication, policies were implemented according to pre-existent routines steadily embedded in the organisation of the French water management sector. The territorial planning procedures did not really succeed in changing the main distinction between agricultural and urban inputs to the ecosystem. To understand this formalization, one has to go back to the late eighties and beginning of the nineties and to remind the process of expertise that took place during the elaboration and implementation of policies aiming at reducing the phenomenon of eutrophication. The issue of eutrophication appeared in France on the governmental agenda in 1988. By that time the monitoring of the superficial waters concerning eutrophication was far from being fully implemented and the scientific controversies concerning the best way to regulate the phenomenon were far from being stabilised. Suddenly in 1988, the problem of

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eutrophication became a problem of pollution involving Nitrogen (from agriculture) and Phosphorus (from urban areas). Here is a classical example of a process of coordination of a pre-existing solution and a raising problem that has been early formalised in the public policy analysis (Edelman, 1991). Indeed, let's consider the political context in 1988. The government started to consider the issue when Rhône Poulenc, the main French manufacturer of detergents was blamed for worsening eutrophication, by its Anglo-Saxon competitors, who no more used phosphates. Rhône Poulenc decided to raise a controversy about the toxicity of the products used as substitutes to phosphates. The ministry of Environment did not close the controversy but, relying mainly on a single expertise of Carbiener (1990), fellow of the University of Strasbourg specialised in pharmaceuticals, the administration called for a progressive abatement of the phosphates in detergents and integrated Phosphorus (and Nitrogen) in the list of "pollutants" which had to be drastically reduced. The solution was technically and financially plausible. The French industry had developed the processes for such pollution abatement, believing that there would have been a problem of toxicity and public health (rather than a problem of ecotoxicity and environment) with nitrates in the coming years (CSI, Lyonnaise des Eaux, 1996). The water agencies could subsidise the equipments.

The implementation of the public policies corresponding to the problem formulation was also completely dependant on what we propose to call a structure of political and technological opportunities. The definition of the vulnerable and priority areas, as prescribed by the European directives Nitrates and Urban Waste Waters Waters<sup>5</sup> was done according to administrative routines. Civil servants from the environmental administration, in charge of defining the priority areas according to the Urban Waste Waters directive, did not take into account the geography of vulnerable areas, designed by the civil servants of the ministry of agriculture. The first ones considered that all the urban areas should be integrated, beginning by the towns located in the upstream parts of the watersheds; the second ones considered that the only reliable criteria was an es-

<sup>5</sup>Directive 91/676/CEE, December 1991, and Directive 91/271, May 1991.

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established or forecasted excess of nitrates in the resource used for drinkable water production. The integration of the agricultural sector in the system of the water agencies fees was also very typical of the weight of the pre-existent routines steadily embedded in the organisation of the French water management sector. The Nitrates directive imposed a standard of no more than 170 kg of Nitrogen per hectare due to breeding. This standard was, in the French case, linked with a system of fees and incentives for the biggest farms, inspired from the existing system of fees imposed to domestic or industrial pollutions<sup>6</sup>. This policy led to some control of the main sources of pollution of the agriculture but a very small concern for other practices generating diffuse pollutions, such as chemical fertilizing. The territorial planning procedures (Schéma Directeur d'Aménagement et de Gestion des Eaux et Schma d'Aménagement et de Gestion des Eaux) did not really succeed in changing the main distinction between agricultural and urban inputs to the ecosystem (Deroubaix and Hubert, 1999).

It took years before the government ordered a serious evaluation on the performances of the policies aiming at reducing the pollution generated by agricultural activities, known as the *Plan de Maîtrise des Pollutions d'Origine Agricole* (PMPOA; literally, Program for the Control of Agricultural Pollutions) (Inspection Générale des Finances, Conseil Général du Génie Rural, des Eaux et Forêts, Comité Permanent de Coordination des Inspections, 1999)<sup>7</sup>. It is very recently that researchers, granted by the

<sup>6</sup>The implementation of fees in the agricultural sector was instead quite different from other sectors as the State subsidised heavily breeding farms (which sometimes exceeded their legal capacity) before they were integrated in the system of fees. This practice is obviously a strange way to implement the polluter-pays principle and have been considered by Brussels as an unfair practice of competition. In October 2003, farmers contributed 0,2% to the total amount of the water pollution fees collected by the water agencies and benefited 7% of granted subsidies (Flory, 2003).

<sup>7</sup>The failure of this program finally led to its reform during the year 2001. After months of negotiation, the European Commission agreed on a new version of the PMPOA. The new regulation based on this agreement put more pressure on all types of farmers' practices – and not only on the runoffs due to breeding. Subsidies now require a change in the practices of

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ministry of Environment, began working on the efficiency of the different types of policy instruments used to reduce agricultural pollutions (taxation, voluntary agreements, regulation) (Doussan, 2002).

5 The case of eutrophication is a good example of the way the structure of political opportunities may affect the forms and the uses of expertise in policy elaboration. The possibility to build an integrated expertise appears as highly dependent on the structure of political opportunities. At the same time, there are procedures that can be used as good opportunities for administrative agents and researchers seeking for a change in the way to develop the knowledge and to manage the aquatic ecosystems. One  
10 of these procedures is the development of policy evaluation these last years (Perret, 2001; Kessler et al., 1998).

In the case of eutrophication, as shown in the previous narration, the lack of political community led to a critical deficit of integrated expertise. On the contrary, in the cases of the wetlands management and the regulation of river flows for hydraulic electricity  
15 plants, there were policy entrepreneurs who used existing policy evaluation procedures in order to promote their cause.

3.2 Public policy evaluation as an opportunity for political public policy communities: comparison of the wetland management and the river flows evaluations

20 The comparison of those two cases is very heuristic for understanding what type of integrated expertise is possible when a group of administrative agents and experts cooperates in order to implement a policy evaluation procedure.

The evaluation on wetlands management can be considered as an evaluation ex ante, implemented in order to formulate a program of management or at least a referential for such a management, instead the one on the compulsory river flows is an evaluation ex post, already planned in the law. The evaluation on wetlands management  
25 involved a wide range of concerned stakeholders instead the one on river flows involved fertilising and in the uses of pesticides.

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only the representatives of the ministry of Environment and experts from the CEMA-GREF, a research centre under the control of the ministry of Agriculture (Secrétariat d'Etat auprès du Premier Ministre chargé de l'Environnement et de la Prévention des risques technologiques et naturels majeurs – Centre National du Machinisme Agricole, du Génie Rural, des Eaux et Forêts, 1990). For the wetlands evaluation, the network involved scientists, experts from the environmental administration and representatives of environmental protection agencies (Comité interministériel de l'évaluation des politiques publiques, Commissariat au Plan, 1994).

The problem for the experts involved in the wetlands management evaluation was to materialise the very extensive definition of the wetlands as incorporated in the Law on water management of 3 January 1992. For the evaluation of compulsory river flows, the problem was to assess the relevance of the flows prescribed by the Law on fishery of 29 June 1984 and to tell the interest of implementing flows adapted to each river which could be changed during a year period.

Let's examine the methodologies developed in each case and explicit the constraints that experts had to face in order to produce an integrated expertise. Of course the methodologies were completely different in one case and the other. In the case of the river flows, the methodology developed by the CEMAGREF consisted in a modelling tool aiming at predicting the preference of the fish for different types of habitats, depending on the flow (and not on pollutions or floods). In the case of the wetlands, the methodology consisted mainly in aggregating the discourses of forty local experts in order to establish a mapping of the most interesting wetlands from an ecological point of view.

Each of these methodologies contained different types of constraints. The model can be considered as "neutral" whereas the contribution of the local experts may be considered as "controversial". However, the interviews showed that the marks provided by the model needed to be interpreted. This interpretation quite rapidly raised new controversies. The sensitivity of the model had to be precisely assessed. Therefore, the panel of experts felt the necessity to enlarge the network of experts in order to exper-

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5 iment the method in situ and to validate the model. Representatives from the French company of electricity (EDF), the water agencies, the Conseil Supérieur de la Pêche (a public body in charge of fishing), were integrated in the procedure of experimentation. The restructuring of the network led to changes in the model such as the taking into

10 account of food availability. Still, to be used as a procedure of political deliberation, the model should have incorporated one of the actors presently not represented in the existing equations: the fishers. The social acceptability of the model as a way to determine the optimal “ecological” flow – rather than the legal flow – also depends on the fishers’ organisations.

10 In the case of the wetlands, the methodology was completely different. The procedure was public. The methodology, the ongoing and final results were presented and discussed with representatives of various ministries, professional organisations, NGOs... The tools for the evaluation of the characteristics of the wetlands and the related management practices were not the model but two questionnaires, two case-

15 studies and a set of interviews with the agents in charge of the implementation of environmental policies in the wetlands. The main result of this evaluation was the production of an atlas of the wetlands of national interest and a clear view of their evolution. The strategy consisting in assessing the evolutions was successful. It avoided a battle of contradictory examples. But, according to the protagonists, the evaluation

20 failed in clearly establishing the responsibilities in the management practices leading to the progressive destruction of the wetlands. This is probably the main risk with the qualitative evaluation when the report has to be accepted by all the concerned actors.

25 The two evaluations here presented clearly illustrate the point that the possibility to change the existing political choices, using scientific expertise, relies on a difficult balance between the robustness of the assessment methodology and the representation of the pluralistic concerned groups and interests. The political public policy communities aiming at implementing an integrated water management will always be confronted to these structural choices. The analysis of the new legislation on water management (law of 30 December 2006) reveals that these evaluations led to contrasted results.

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The new legislation will authorise the negotiation of a specific river flow for each river. However the law does not indicate the way to calculate the flow that will enable to reach the good ecological status. Concerning the preservation of the wetlands the law states that the “wetlands of national interest” have to be taken into account in the territorial planning procedures.<sup>8</sup>

## 4 Conclusions

The analysis of the various cases of water policy formulation here considered revealed that the possibility to produce an integrated expertise (e.g. an expertise favouring a good balance between the concerned interests and the preservation of the aquatic ecosystem) depended on the existence of a political public policy community. Such a community did not exist when eutrophication came on the political agenda. On the contrary, there were groups of administrative agents and scientist cooperating when came the time to assess the compulsory river flows and the management of the wetlands. But the existence of these political communities is not the end of the story and we noticed that, in each case, the methodological choices led to very different results. The integration of the interests was undoubtedly the largest in the case of the wetland management whereas it stayed hypothetic in the case of the compulsory river flows because of the lack of consultation with the fishers. On the contrary, the evaluation of the river flows relied on a modelling tool which could generate a radical change in the management of the river flows whereas the methodology used in the case of the wetlands only led to marginal changes in their management.

<sup>8</sup>However, the management of wetlands, their protection and valorisation is the purpose of public policies through other legislation (Law on the Development of the Rural Areas DTR n°2005–157, February 2005, *Law on the agricultural sector* n°2006–11, January 2006) and through specific bodies at a national level (An institute in charge of monitoring the wetlands evolution since March 1995) or at a regional scale (a technical committee in charge of the wetlands in the Rhone-Méditerranée-Corse watershed).

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However, these two cases of river flows and wetland management are quite significant of the evolution of the role of experts in the water management field. When the structure of political opportunities is favourable, the scientists involved in the expertise procedures are more and more mediators rather than only experts who have to decide on an issue according to their specific knowledge (Roqueplo, 1997). These new experts have to develop tools in collaboration with the concerned actors. They have to be part of a political community and to play a very active role in this community.

But scientific experts are also more and more part of intellectual public policy communities. As explained in the first part of this paper, it is partly in the framework of these intellectual communities that the right modes of public action and the good practices and objects of research are discussed and validated. The main finding of the presented research was that the user was cruelly lacking in these intellectual public policy communities. Nonetheless the integration of the final user might probably favour real multidisciplinary researches. This reflection on the final user identification and on the best way to integrate him in the community has begun in some places in France such as the PIREN Seine (Interdisciplinary Research Program on the river Seine) or the Conseil Regional d'Ile de France (The Great Paris Council). Environmental protection organisations are now involved in the elaboration and implementation of some research programs<sup>9</sup>. But the co-production of science by citizen and scientists is still an open issue.

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<sup>9</sup>Such as the Partenariat Institutions Citoyens pour la Recherche et l'Innovation "Vers une gestion citoyenne de l'eau en Ile de France", <http://www.picri.h2o.net>

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**Table 1.** Distribution of the seven programs of the GIP Hydro systems.

Title of the program	Disciplines	Integration of the disciplines
Economic Assessment of the benefits due to hydro-systems Flood Risks	Social science  Multidisciplinarity (Hydraulics – Hydrology – Geography – Management – Political Science – Sociology and Psychology – management)	Economy is the exclusive branch of knowledge mobilised There is no coordination between the various branches of knowledge
Territorial Research	Multidisciplinarity Physics – chemistry – biology and socio-economy	The coordination is done through a territorial approach, the collected data being the first material for a body in charge of assessing the “quality” of a watershed
National Program of Research on Wetlands	Interdisciplinarity Social science (sociology – law – economics) and “hard science” (Biology – Geology)	Some topics are exclusively considered through one or two branches of the “hard science”; some topics constitute a real attempt to integrate social science studies and hard science. Nonetheless, in this last case, the integration consisted more in integrating existing studies related to one specific site rather than investigate on an issue using various branches of knowledge.
Biological Parameters	Natural science (Biology)	Biology is the exclusive branch of knowledge mobilised

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**Table 1.** Continued.

Title of the program	Disciplines	Integration of the disciplines
Functional Role of Biodiversity in the Continental Aquatic Ecosystems	Natural science (Ecology – biology – chemistry – geology)	The integration of the various branches of knowledge of the hard science is partly realised through modelling tools
Meteorological Radars for the prevision of floods and the management of sewage networks	Natural science (Engineering – hydrology – meteorology – mathematics)	Integration through a technical device (the system of alert) of the different branches of the hard science mobilised

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